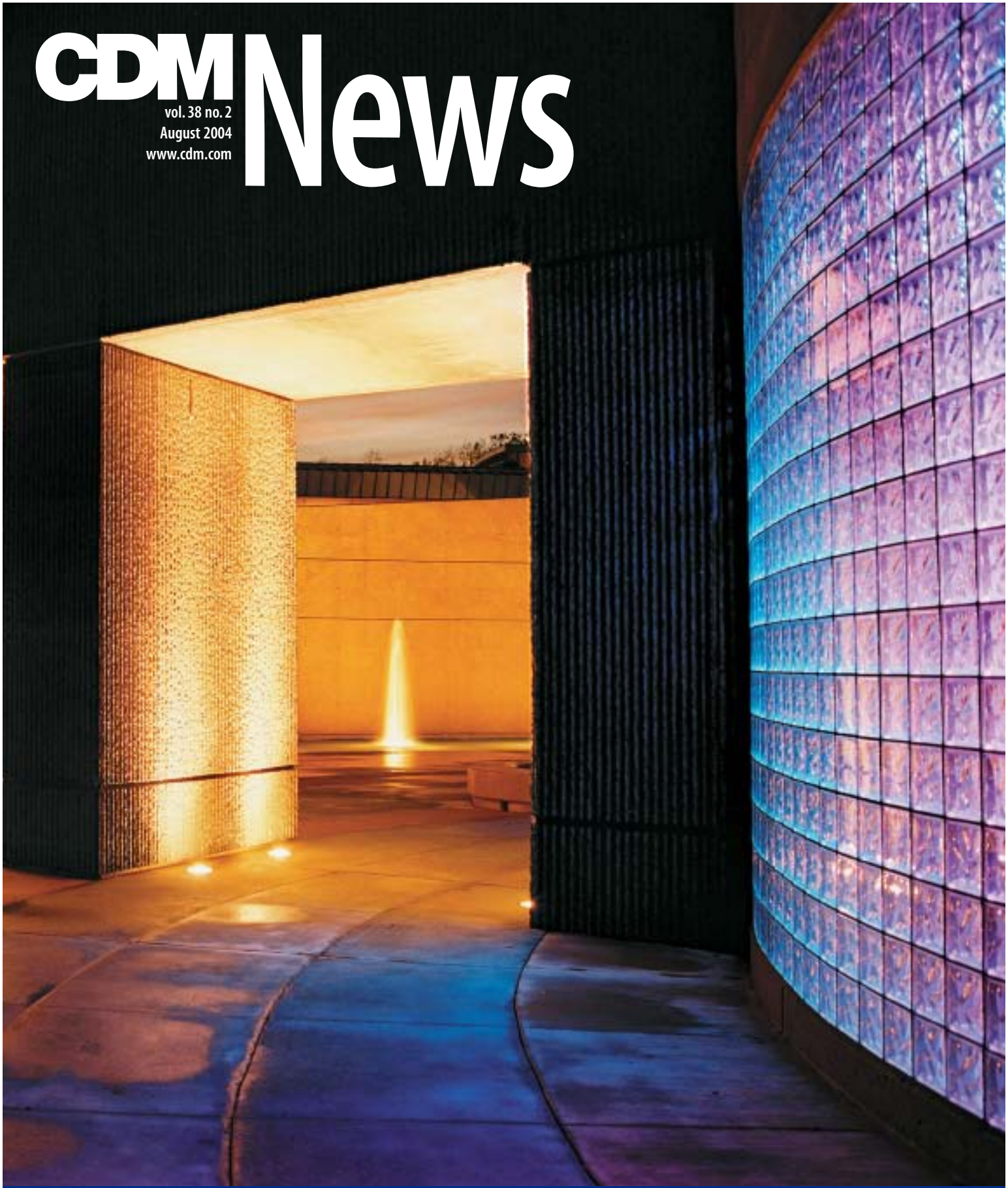
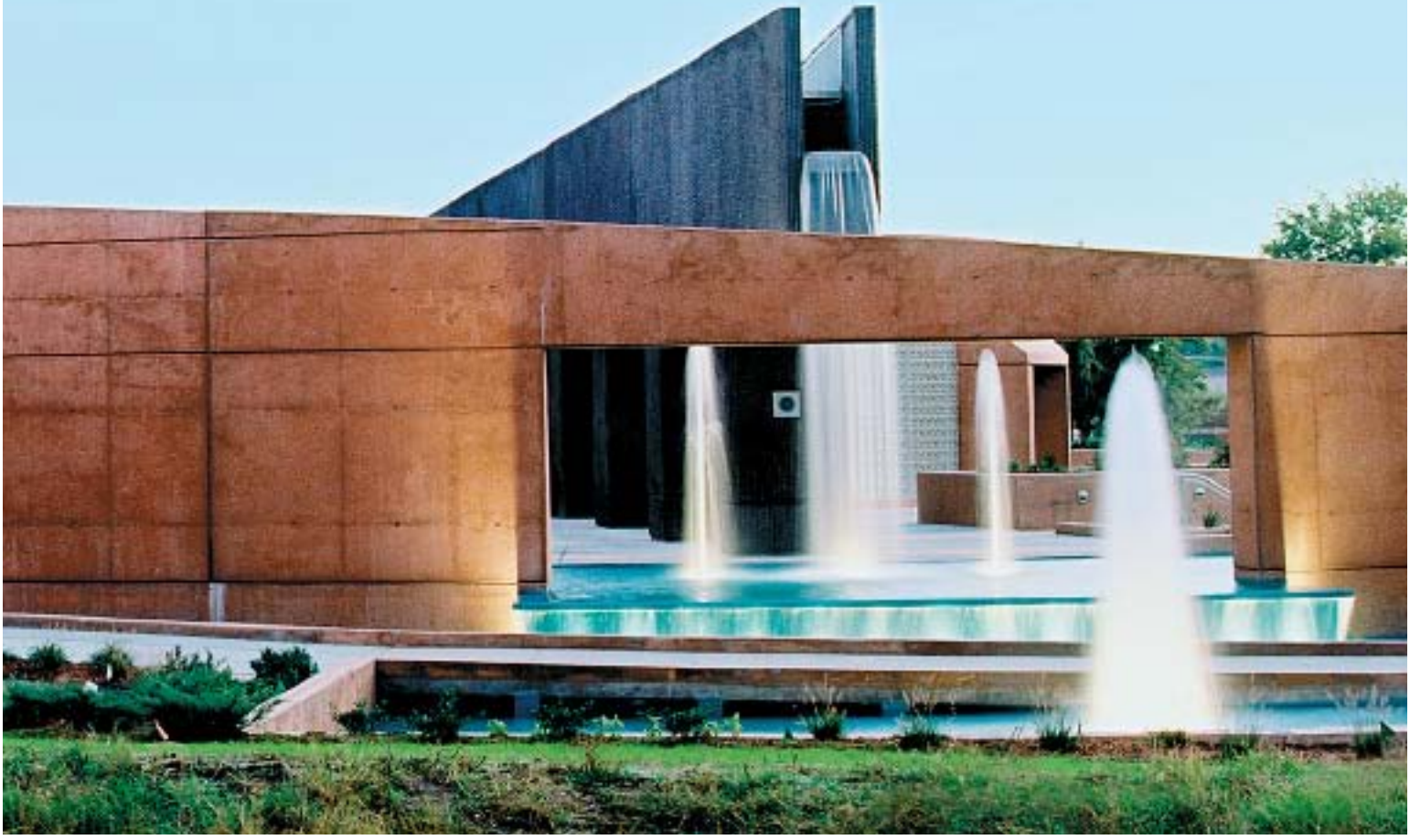
CDM News
vol. 38 no. 2
August 2004
www.cdm.com



# Article Reprint: CDM Sweeps 2004 AAEE Engineering Excellence Awards

# CDM Sweeps 2004 AAEE Engineering Excellence Awards


Reflecting pools, waterfalls, dramatic architecture, and environmental education resources are drawing citizens to the Wichita Area Treatment, Education and Remediation (WATER) Center. They are also attracting a lot of industry attention—and awards. The WATER Center is part of a CDM-designed standout groundwater remediation project that earned the 2004 Superior Achievement Award—the fourth consecutive year that CDM has earned the coveted top award—in the American Academy of Environmental Engineers (AAEE) Excellence in Environmental Engineering competition. CDM also earned four other awards in the competition, including grand awards in operations and management, planning, and small projects, and an honor award in design.



*Above: The treatment system and education center are integrated into an existing park, beautifying the community while accomplishing environmental cleanup.*

*Right: The WATER Center teaches schoolchildren and other visitors about the importance of pollution prevention and environmental stewardship.*

## Green and Clean Intersect at Gilbert & Mosley:

### *Superior Achievement Award/Best of Show*

The proactive efforts of the city of Wichita, Kansas, are accomplishing a landmark cleanup and promoting economic redevelopment of the contaminated Gilbert and Mosley site—once a hazardous waste liability—without Superfund intervention. Groundwater beneath the 3,850-acre site was contaminated with varying concentrations of chlorinated solvents (tetrachloroethene, trichloroethene, dichloroethene, and vinyl chloride) and other compounds, and posed a significant risk to human health and the environment. With the site facing possible Superfund intervention in the 1990s, real estate development in several areas of the site had all but ceased, and the values of thousands of properties were in jeopardy.

Using a design-build approach, CDM provided Wichita with a seamless remediation and redevelopment solution, delivering the landmark WATER environmental education and treatment facility that cleanses 1.2 million gallons per day (mgd) of contaminated groundwater. At the core of CDM's treatment system is a hydraulic-venturi air stripper, chosen for its compact size, quiet operation, and ease of maintenance. The system is designed to remediate a contaminated groundwater plume that is nearly 4 miles long and 2 miles wide. CDM's work

*Below: The groundwater treatment system—which incorporates 13 extraction wells, 5.5 miles of piping, and a hydraulic-venturi air stripper—treats 1.2 million gallons of contaminated groundwater per day.*

helped protect human health and the environment, the city gain national recognition for its proactive measures, and jumpstart downtown redevelopment.

"The Gilbert and Mosley project is considered to be one of the most innovative public-private partnerships ever created to solve the complex environmental problem of groundwater contamination," said Wichita Mayor Carlos Mayans, at the WATER Center grand opening on October 16, 2003. "This project has earned the city of Wichita national recognition for its development to avoid Superfund intervention and the impacts upon public health, environmental risks, and the local economy."

Together, the WATER Center's treatment building, environmental education building, and various site improvements (plaza, fish observatory, creek, rehabilitated park shelter, and others) are helping to teach schoolchildren and visitors about the importance of pollution prevention and environmental stewardship.

*"The Gilbert and Mosley project is considered to be one of the most innovative public-private partnerships ever created to solve the complex environmental problem of groundwater contamination."* — *Carlos Mayans, Wichita Mayor*

Among other innovations, treated water is reused in fountains, aquariums, and other water features in the new education center. The dramatic architecture, water features, and environmental education components combine to make the WATER Center a resource for the entire Wichita community. The project also won a national Honor Award from the American Council of Engineering Companies.

*Carlos Mayans, Wichita Mayor*

*The CDM team developed a performance improvement program of training and certification, including training modules and procedures for five categories of maintenance professionals.*

## Head of the Class: First-in-the-Nation Maintenance Certification

### *Grand Award—Operations & Management*

Working in unison with the District of Columbia Water and Sewer Authority (DCWASA) and its maintenance employees, CDM helped develop the first-in-the-nation maintenance certification program for the water and wastewater industry. This monumental achievement for five classes of maintenance personnel will forever change how the utility functions and empowers its diverse workforce.

With a strong emphasis on union and employee buy-in throughout the process, DCWASA management and employees shared a vested interest in each step of the program's development. From the initial analyses of work functions and job descriptions, to training modules, and finally the certification exam (developed with and given by the International Maintenance Institute, an independent entity), the project fostered a collaborative top-down/bottom-up planning and execution process.

Net results of this flagship training program are more than just certificates. The program instills a sense of employee pride in work well done, and provides a means to recognize maintenance personnel for the extremely important job they do daily—protect public health. In addition to enhancing staff engagement and boosting morale, the program has resulted in substantial cost savings through a condensed workforce and fewer maintenance outsourcing contracts.

Educating foremen and management through a train-the-trainer program has increased professional understanding between management and laborers and improved productivity. In addition, cross-training maintenance staff with operations staff further strengthens the knowledge mix of all employees. By aligning organizational improvements with capital improvements, DCWASA realized that an investment in a utility's human resources maximizes its return on capital investments.


*Specialized environmental officer training provides a forum for EMS leadership, empowering successful fleet-wide management of environmental processes.*

## Save the Waves: Royal Caribbean Achieves Effective Environmental Management

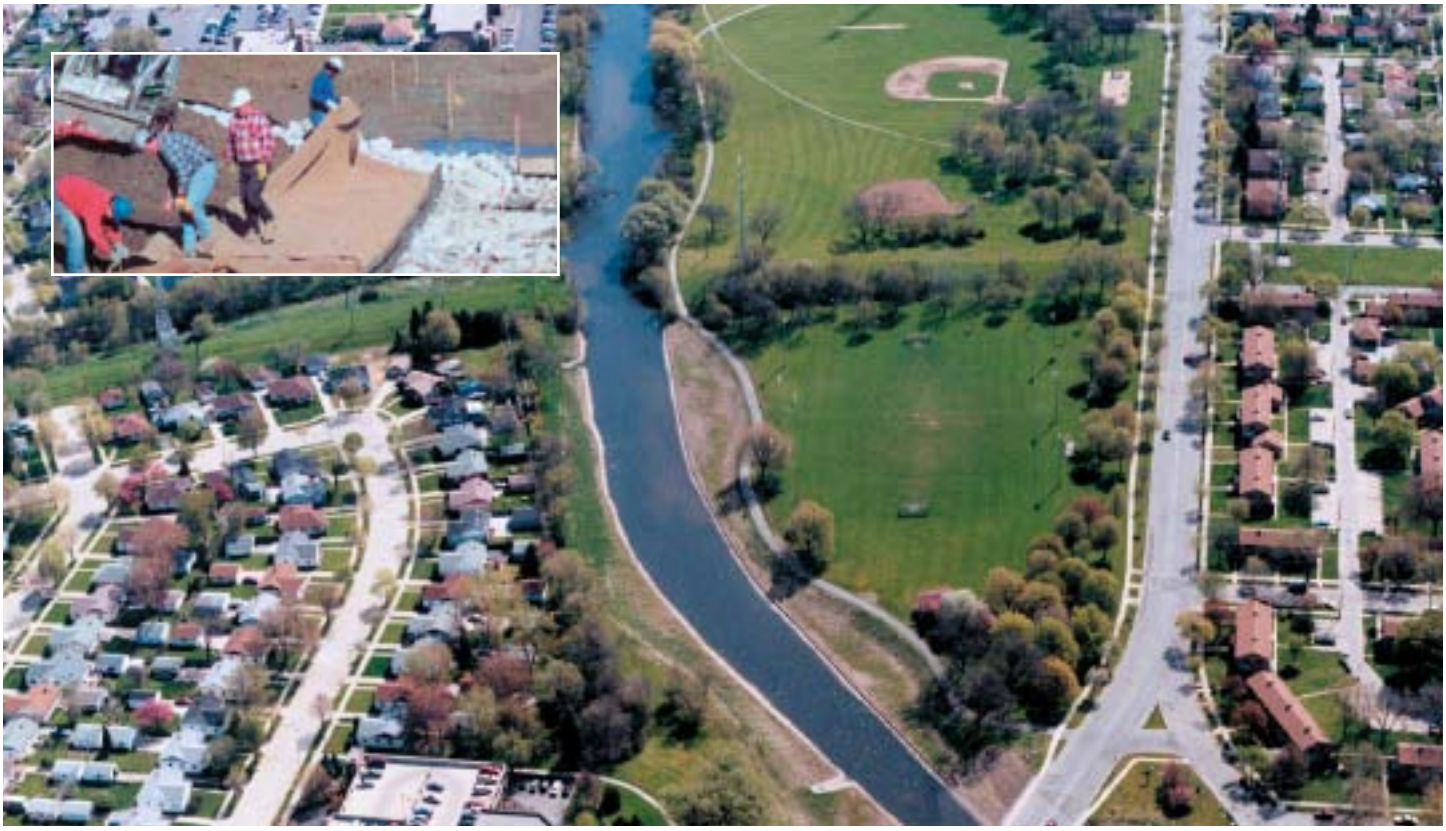
### *Grand Award—Small Projects*

Every day, nearly 60,000 passengers sail the world's seas on Royal Caribbean Cruises Ltd. ships, each with the infrastructure to maintain its complex operations. Every vessel must address a host of environmental factors, including water; wastewater; solid, hazardous, and special wastes; fuel bunkering and storage; and air pollution control. Committed to pollution prevention and environmental protection, Royal Caribbean and CDM established the cruise industry's first comprehensive ISO 14001-certified environmental management system (EMS) and environmental officer (EO) training program, reducing total waste by 89 percent within 3 years.

**Among Royal Caribbean's EMS achievements:**

- Chemical quantities were reduced by 60 percent, from more than 3,000 varieties of chemicals to fewer than 1,200, minimizing waste and generating $75,000 in annual savings.
- The highest standards for oily bilge water treatment are helping the fleet achieve 5 parts per million (ppm) oil in water, surpassing the international standard of 15 ppm.
- Advanced black water treatment improves quality of effluent and optimizes use of chemicals.
- Optimized silver recovery operations improved effluent quality and ensured regulatory compliance, eliminating 40,000 gallons of effluent and recovering 150,000 pounds of silver—yielding $200,000 in annual savings.
- Upgraded dry cleaning operations reduced shipboard perchloroethylene use by 25 percent.
- Recycling increased to nearly 1 million pounds per year.
- Reduced fuel consumption rates improved energy conservation, resulting in substantial savings.

The EMS and EO training program has facilitated greater reductions in waste, environmental impacts, and fuel consumption each year. The specialized EO training empowers successful management of environmental processes and facilitates fleet-wide performance. EOs—responsible for each ship's environmental systems—train crews in all aspects of environmental management and serve as advisors to shipboard management and vital links to shoreside departments. Training reinforces best practices, compliance and organizational improvements, and critical record-keeping procedures, and ensures continued EMS improvement.



*Adapted specifically for Lincoln Creek, a bio-veneer/hardened lining forms the channel's foundation, providing bank integrity and a "natural" surface that supports native prairie vegetation, wildlife, and aquatic habitats.*

## From Floods to Flora and Fauna: Rehabilitating an Urban Watershed

***Honor Award—Design***

Lincoln Creek had a long history of flooding and water quality problems. Severely degraded by 50 years of urbanization and channelization, the 9.2-mile-long tributary of the Milwaukee River drains a 21-square-mile area within the city of Milwaukee, Wisconsin. More than 4,000 flooding problems within the watershed were reported between 1960 and 1997. Two catastrophic floods in 1997 and 1998 produced damages totaling over $88 million.

The $115 million Lincoln Creek environmental rehabilitation project, engineered and designed by CDM for the Milwaukee Metropolitan Sewerage District, is a comprehensive solution, supported by multiple stakeholders, that goes beyond typical flood control. The integrated project enhances the water quality and neighborhood environment of the channel corridor by stabilizing and protecting eroding banks, improving fish and wildlife habitat, and rehabilitating a sustainable community asset that provides flood control for a 1-percent probability flood event. Other achievements include:

- Stream bank reconstruction—using a unique bio-veneer/hardened channel lining of stone topped by layers of soil and native prairie/wetland vegetation—provides structural integrity to minimize bank erosion while supporting the natural ecosystem.
- Detailed conservation plan protects the threatened habitat of the Butler's garter snake by creating snake den sites.
- Low-flow channel, with pools and riffles, and meandering streambed provide a suitable environment for macroinvertebrates and restore aquatic habitat for native fish and wildlife.
- New multipurpose detention facilities provide floodwater storage capacity, serve as educational facilities, and create wetlands for water quality enhancement.
- New pedestrian and traffic bridges maintain and promote interaction between neighborhoods.
- Vegetation management, increased line-of-sight, flatter channel slopes, and reduced flow velocities create a safer, open, and welcoming corridor area.
- Reduced floodplain area will remove over 2,000 structures from the floodplain, eliminating the need for flood insurance while increasing property values.

## Cincinnati's Model Approach to Sewer System Management

### *Grand Award—Planning*

For decades, sewer modeling has often focused on localized problem solving, rather than understanding full system performance. However, rapidly advancing computer technologies—especially faster and cheaper computers, better graphics, and GIS—now allow sewer modeling to be applied on a system-wide scale. CDM and the Metropolitan Sewer District of Greater Cincinnati (MSDGC) have leveraged these technological advances and pioneered a precedent-setting, system-wide model that allows the city and Hamilton County to manage its sewer system. The model is an easy-to-use and exceptionally accurate source for evaluating, prioritizing, and making short- and long-term decisions that can potentially save millions of dollars in future facility costs.

This first-of-its-kind model covers all of MSDGC's 257-square-mile sewer service area, to allow integrated management of the sewer system and significantly improve environmental protection, efficiency, responsiveness, compliance, and savings. The innovative model advances sewer system operation and management, simulating hydraulic inter-dependencies between the collection system and treatment plants to track flows through the system.

Additionally, the pioneering use of radar-based rainfall data addresses rainfall and flow variability by pinpointing actual rainfall within a sewershed to maximize accuracy, even under localized rainfall conditions. The innovative rain radar data Web display provides the data in near real time to operators and managers. Real-time controls will be achieved through the model's unique ability to track flows throughout the collection system, preventing overflows during wet weather, enhancing operational efficiency, and improving water quality.

Rigorous data collection realized exceptional quality and, together with the radar-based rainfall data, enabled model results to achieve verification agreement at nearly twice the accuracy previously considered possible—ensuring that model-based decisions are consistently accurate, future facilities are sized appropriately, and upgrade costs are minimized. MSDGC expects to save millions of dollars in collection system upgrades, substantially limiting the ratepayer burden and efficiently addressing residents' concerns.

*CDM and MSDGC's revolutionary partnering approach included a three-tiered, hands-on training program that equipped city staff at all levels—from technicians to managers—to leverage the power of the model and achieve world-class system efficiency and full regulatory compliance.*